PATENT COOPERATION TREATY

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From the
INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	16 May 2005 (16-05-2005)
Applicant's or agent's file reference 58001-59	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/CA2005/000089	26 January 2005 (26-01-2005)	27 January 2004 (27-01-2004)

International Patent Classification (IPC) or both national classification and IPC
IPC[7]: B01D-53/26, B01D-45/08, B01D-5/00

Applicant
ALBERTA RESEARCH COUNCIL INC. ET AL

1. This opinion contains indications relating to the following items :

[X]	Box No. I	Basis of the opinion
[ ]	Box No. II	Priority
[ ]	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
[ ]	Box No. IV	Lack of unity of invention
[X]	Box No. V	Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.
[ ]	Box No. VI	Certain documents cited
[X]	Box No. VII	Certain defects in the international application
[ ]	Box No. VIII	Certain observations on the international application

2. **FURTHER ACTION**
If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001(819)953-2476	Authorized officer **Harold Gallagher (819) 934-2332**

Form PCT/ISA/237 (cover sheet) (January 2004)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language which it was filed, unless otherwise indicated under this item.

[ ] This opinion has been established on the basis of a translation from the original language into the following language __, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of :

a. type of material

[ ] a sequence listing

[ ] table(s) related to the sequence listing

b. format of material

[ ] in written format

[ ] in computer readable from

c. time of filing/furnishing

[ ] contained in the international application as filed.

[ ] filed together with the international application in computer readable form.

[ ] furnished subsequently to this Authority for the purposes of search.

3. [ ] In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments :

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International application No. PCT/CA2005/000089

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1 - 53	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	7, 8, 22, 23, 34, 35, 36, 40, 49, 50, and 51	YES
	Claims	1-6, 9-21, 24-33, 37-39, 41-48, 52, and 53	NO
Industrial applicability (IA)	Claims	1 - 53	YES
	Claims	NONE	NO

2. Citations and explanations :

Attention is drawn to the following documents:

D1: CA 2 388 108 A1 (Krepelka D.), 10 Dec 2003 (10-12-2003)

D2: GB 1 505 293 A1 (Biebighaeuser Metallwerk), 30 Mar 1978 (30-03-1978)

D3: US 6 080 225 (Förster M.), 27 Jun 2000 (27-06-2000)

D4: CA 1 113 024 (Arhippainen B. et al.), 24 Nov 1981 (24-11-1981)

Novelty

The subject matter of Claims 1-53 meets the requirements of *PCT Article 33(2)*. The subject matter of Claims 1-53 is novel in respect of the prior art as defined in the regulations (*PCT Rule 64*) and thus meets the requirements of *PCT Article 33(2)*.

Inventive Step

Claims 1-6, 9-21, 24-33, 41-48, 52, and 53 do not comply with *PCT Article 33(3)*. The subject matter of these claims would have been obvious on the claim date to a person skilled in the art or science to which it pertains having regard to D1 in view of common general knowledge.

D1 discloses a method and apparatus for removing liquid from a gas stream. The design of the apparatus causes the incoming gas stream to display turbulence within the cavity of the apparatus as a result of baffles located within the cavity. The impact causes the liquid in the gas stream to compress and condense on the surface of the baffle. The liquid then moves from the baffle to the internal wall of the cavity and slides down the cavity wall into a lower collecting area of the apparatus. The liquid can then be manually or automatically drained off through a valve.

Claims 1-6, 9-21, 24-33, 41-48, 52, and 53 do not comply with *PCT Article 33(3)*. The subject matter of these claims would have been obvious on the claim date to a person skilled in the art or science to which it pertains having regard to D2 in view of common general knowledge.

D2 discloses a method and device for the separation of oil from gaseous fluids. The device comprises an inlet, outlet, and turbulence producing means comprising at least one baffle located in the housing. The baffle plate or plates are the sole means in the device for causing the separation of the oil from the gaseous fluid. The liquid droplets in the gas stream are forced against the baffles as a result of the turbulent gas flow. Once the liquid contacts the baffle it condenses on its surface. The device comprises a slot through which the separated oil drains into a tube.

.....continued in Supplemental Box.....

WRITTEN OPINION OF THE
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International application No.
PCT/CA2005/000089

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted :

The abstract does not comply with *PCT Rule 8.1(d)*. Each technical feature mentioned in the abstract and illustrated by a drawing in the international application should be followed by a reference sign, placed between parentheses.

The claims do not comply with *PCT Rule 6.2(b)*. Where the international application contains drawings, the technical features mentioned in the claims shall preferably be followed by the reference signs relating to such features. When used, the reference signs shall preferably be placed between parentheses.

The drawings and/or the description do not comply with *PCT Rule 11.13(l)*. Reference signs not mentioned in the description shall not appear in the drawings, and vice versa. Reference character "152" appears in Figure 2A and Figure 2B, but fails to appear in the description.

The description does not comply with *PCT Rule 11.13(m)*. The same features, when denoted by reference signs, shall, throughout the entire application, be denoted by the same signs.

On page 31, line 28 of the description, reference character "30" is used to represent the "collection vessel", however previously, reference character "30" was used to designate the "flow conditioner" and reference character "36" was used to represent the "collection vessel".

On page 32, line 15 of the description, reference character "24" is used to represent the "first collector surface" for the embodiment in which the apparatus employs a plurality of flow path assemblies. It is believed that this reference to the "first collector surface" is to be represented by reference character "124" instead of "24".

On page 32, line 32 of the description, reference character "30" is used to represent the "flow conditioner" for the embodiment in which the apparatus employs a plurality of flow path assemblies. It is believed that this reference to the "flow conditioner" is to be represented by reference character "130" instead of "30".

On page 33, line 4 of the description, reference character "130" is used to represent the "collection vessel", however previously, reference character "130" was used to designate the "flow conditioner" and reference character "136" was used to represent the "collection vessel".

On page 34, line 9 of the description, reference character "135" is used to represent the "drainage mechanism", however previously, reference character "135" was used to designate the "conditioner/distributor" and reference character "146" was used to represent the "drainage mechanism".

Figure 2A does not comply with *PCT Rule 11.13(m)*. The same features, when denoted by reference signs, shall, throughout the entire application, be denoted by the same signs. The occurrence of reference character "120" between reference characters "144" and "136" is problematic. Reference character "120" is used to represent the "collection apparatus", while the occurrence of reference character "120" between reference characters "144" and "136" is pointing at the "flowpath" of the "collection apparatus".

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: **Box No. V: Reasoned Statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step...**

Claims 1-6, 9-21, 24-33, 41-48, 52, and 53 do not comply with *PCT Article 33(3)*. The subject matter of these claims would have been obvious on the claim date to a person skilled in the art or science to which it pertains having regard to D3 in view of common general knowledge.

D3 discloses a method and apparatus for separating liquid droplets from a gaseous stream. The method involves introducing the gas stream into shaped elements having narrow channels such that turbulence is generated along the flow path causing the liquid droplets entrained in the gas stream to strike the channel walls and deposit thereon. The apparatus includes a plurality of shaped elements having narrow channels in which the gas stream flowing between the channels is cause to exhibit turbulence along the flow path causing the liquid droplets entrained in the gas stream to strike the channel walls and deposit thereon.

Claims 1-6, 9-21, 24-33, 37-39, 41-48, 52, and 53 do not comply with *PCT Article 33(3)*. The subject matter of these claims would have been obvious on the claim date to a person skilled in the art or science to which it pertains having regard to D4 in view of common general knowledge.

D4 discloses a method and apparatus for purifying furnace gases containing molten and evaporated components. Gases are made to pass through a channel provided with a turbulence generating means. The droplet separation is mainly carried out by means of the turbulent movement of the particles which causes the droplets to impinge against the surfaces of turbulence generating means and condense on their surfaces. The condensed liquid is removed from the apparatus through an opening. To achieve adequate flow velocity, the gas in the separator is greater than 6m/sec.

It is held that a person skilled in the art of separation of gases or vapours would have known that liquid droplets could be separated from a gaseous stream by employing a method and apparatus that causes the gas stream to exhibit turbulent flow via baffles in the apparatus. It well known in the art that liquid droplets in a gaseous stream will condense on a surface in the flowpath of a turbulent gas stream and therefore can be separated from the gaseous stream. Therefore one skilled in the art with the knowledge of D1, D2, D3, or D4 and common general knowledge would find no inventive step in the subject matter disclosed in Claims 1-6, 9-21, 24-33, 37-39, 41-48, 52, and 53.

None of the cited references teach or disclose an apparatus for removing liquid droplets from a gas stream comprising:
a flowpath for the gas stream;
a collector surface for collecting the droplets;
a flow conditioner that provides a substantially turbulent gas stream;
a drainage mechanism for draining collected droplets from the collector surface;
AND
having the drainage mechanism comprising a plurality of slits defined by the collector surface.

None of the cited references teach or disclose a method for removing liquid droplets from a gas stream comprising:
conditioning the gas stream so that the gas stream exhibits turbulent flow;
passing the gas stream in communication with a collector surface(s), thereby causing the droplets to collect on the collector
surface;
draining the collector surface to remove the collected droplets from the collector surface;
AND
passing the gas stream at a superficial velocity which is less that the critical atomization gas velocity of the gas stream in the flowpath
OR
passing the gas stream under conditions such that the Weber number is less that or equal to 30.

Therefore, the subject matter of Claims 7, 8, 22, 23, 34, 35, 36, 40, 49, 50, and 51, involves an inventive step in respect of the prior art as defined in the regulations (*PCT Rule 65(1)(2)*) and thus meets the requirements of *PCT Article 33(3)*.

Industrial Applicability

The subject matter of Claims 1-53 comply with *PCT Article 33(4)* since the claimed invention is considered to be industrially applicable since according to its nature, it can be made or used (in the technological sense) in industry.